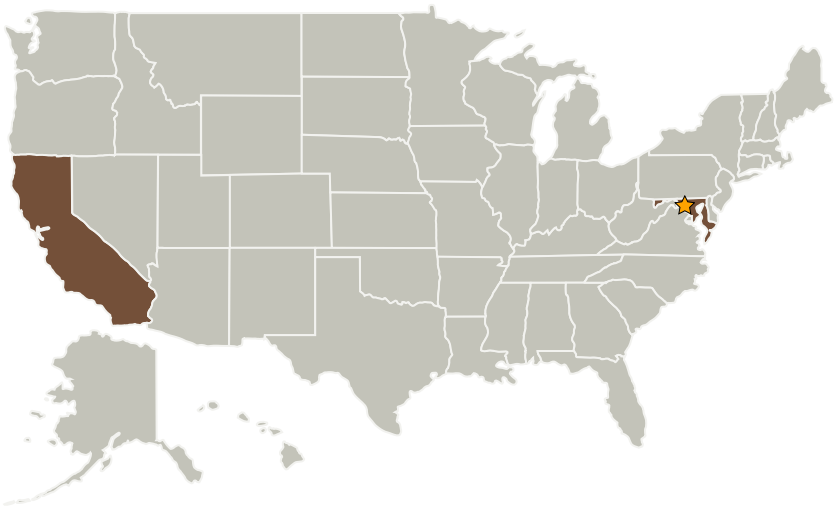
Physics Mining of Multi-source Data Sets, Phase I

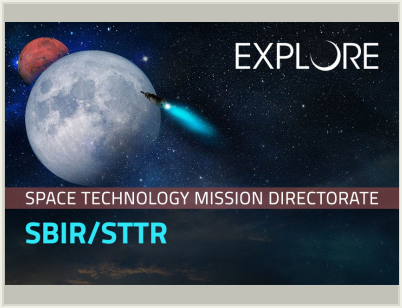
Completed Technology Project (2009 - 2009)

Project Introduction

We propose to implement novel physics mining algorithms with analytical capabilities to derive diagnostic and prognostic numerical models from multi-source observational data. These techniques yield higher-resolution measures than ever before of environmental parameters by fusing synoptic imagery and time-series measurements. These techniques are general and relevant to observational data, including raster, vector and scalar, and can be applied in all earth and environmental science domains. Because they can be highly automated and are parallel, they scale to large spatial domains and are well-suited to change and gap detection. This makes it possible to analyze spatial and temporal gaps in information and facilitates within-mission re-planning to optimize the allocation of observational resources. As a demonstration project, we have selected a standard climatological metric and will show that we can generate an analogue of this metric by using our method. In particular, we will use the MineTool algorithms to derive an analogue for Palmer's Drought Severity Index. We will compute this index for a region of the western United States using a set of archival terrestrial products (e.g., Landsat, AVHRR, Aqua/Terra) and a set of weather and climate products (e.g., NOAA satellites, federal, state, local hydrological time-series). Then, using the same dataset, we will produce a physics-based model from the MineTool analysis of the data.

Primary U.S. Work Locations and Key Partners





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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Goddard Space Flight Center (GSFC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Goddard Space Flight Center(GSFC)	Lead Organization	NASA Center	Greenbelt, Maryland
SciberQuest, Inc.	Supporting Organization	Industry	Del Mar, California

Primary U.S. Work Locations	
California	Maryland

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX05 Communications, Navigation, and Orbital Debris Tracking and Characterization Systems
  - TX05.1 Optical Communications
    - TX05.1.6 Optimetrics